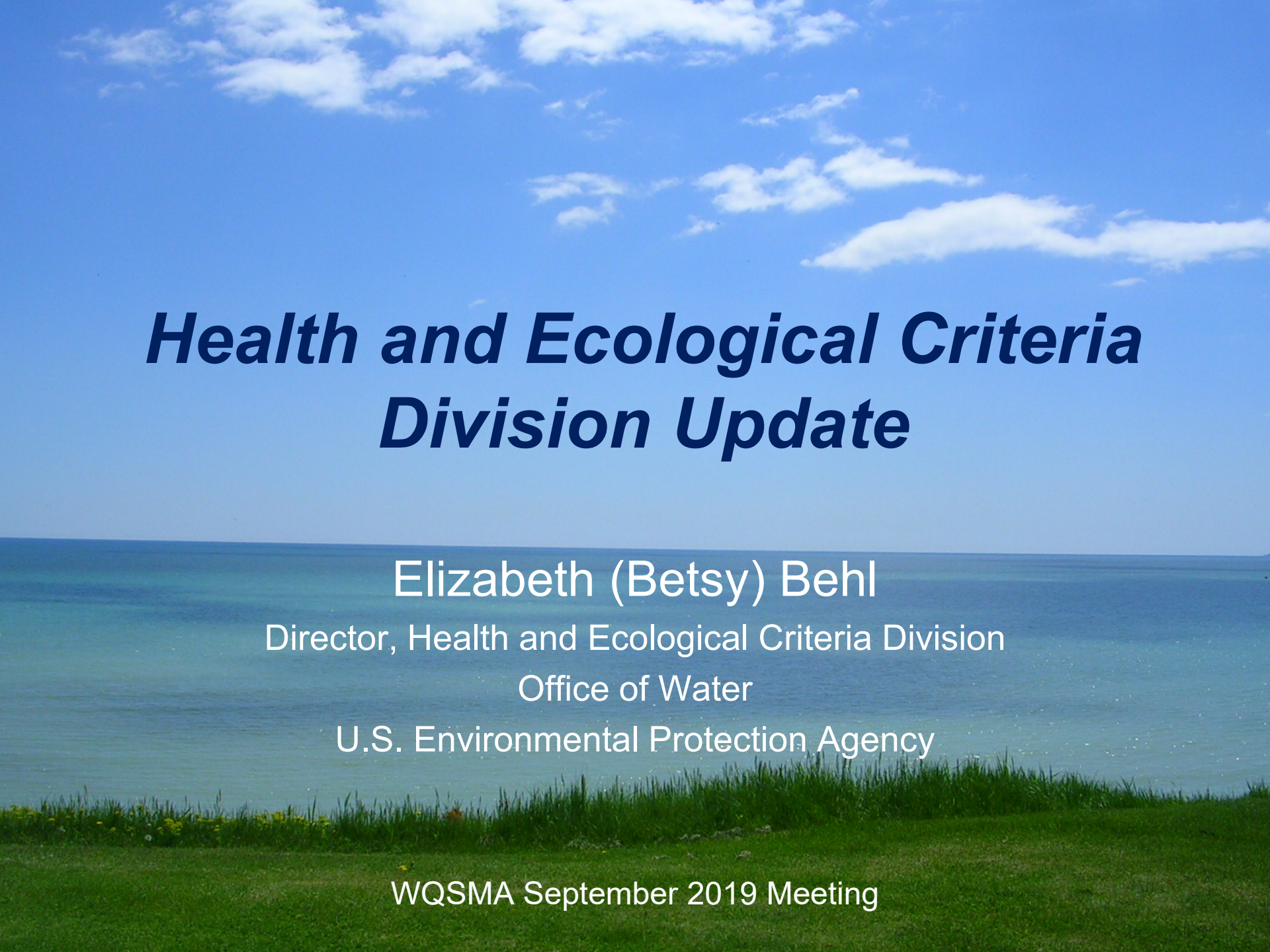


Health and Ecological Criteria Division Update

Elizabeth (Betsy) Behl
Director, Health and Ecological Criteria Division
Office of Water
U.S. Environmental Protection Agency

WQSMA September 2019 Meeting

ACCOMPLISHMENTS IN FY2019

Aquatic Life Criteria

Aluminum Aquatic Life Criteria

- December 2018: EPA released the final 2018 update of the recommended aquatic life ambient water quality criteria for aluminum in freshwater.
- Final 2018 recommended criteria include a calculator built upon an underlying peer-reviewed model that accounts for changes in aluminum bioavailability in a water body based on site-specific water chemistry parameters—pH, dissolved organic carbon (DOC), and total hardness.
- Provides users the flexibility to develop site-specific criteria based on local water chemistry.
- Many states that adopt the updated 304(a) criteria calculator are likely to have higher values as aluminum criteria, compared to the 1988 values that did not vary with water chemistry. Some states that have low pH waters may have more stringent criteria.
- OST released draft implementation materials for public comment on August 1. The public comment period ends on September 13th.

Aquatic Life Criteria

Frequency and Duration Experts Workshop

- Aquatic Life Ambient Water Quality Criteria for toxics establish short-term (acute) and longer-term (chronic) chemical concentrations (magnitudes), averaged over a given time period (duration), that should not be exceeded more than the allowable number of times during a specified time period (frequency).
- EPA is hosting an Experts Workshop to review the current science relevant to duration and frequency, evaluate relevant science that has become available since 1985 and the implications of this information on frequency and duration currently used in criteria, and identify areas for future research.
- Experts participating are scientists from industry, academia, and state and federal government with expertise representing a range of considerations relevant to frequency and duration.
- The Workshop is September 11-12, 2019 in Arlington, Virginia
- Meeting proceedings will be prepared following the Workshop and will be publicly available in FY2020.

Aquatic Life Criteria

Endangered Species Assessment

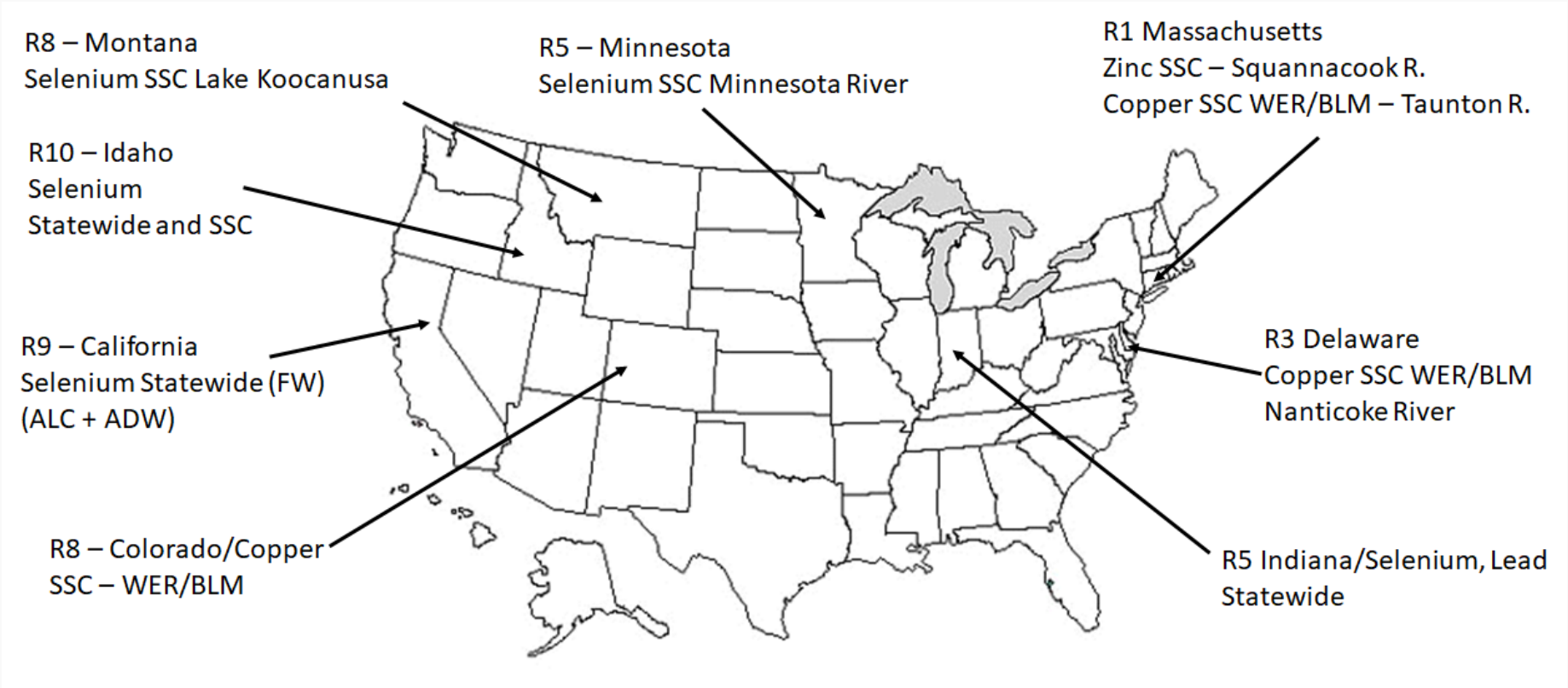
Since the summer of 2017 Regions have taken the lead in engaging with the Services (FWS and NOAA-NMFS) in Endangered Species consultations on approval of Water Quality Standards.

OST has worked closely with Regions to develop the Biological Evaluations (BE) and to address issues raised by the Services in consultation resulting **in CONCURRENCES from FWS and NMFS for >70 species**

criterion	service	state	# species	date
Freshwater ammonia	FWS	Maine Virginia Kansas	1 47 12	2016 2018 2018
Freshwater ammonia Saltwater ammonia	NMFS	Virginia	2 11	2018
Freshwater selenium	FWS	W Virginia	4	2017 (not final)
Freshwater cadmium	FWS	Virginia	47	2018
Freshwater copper	NMFS	Delaware	2	2017

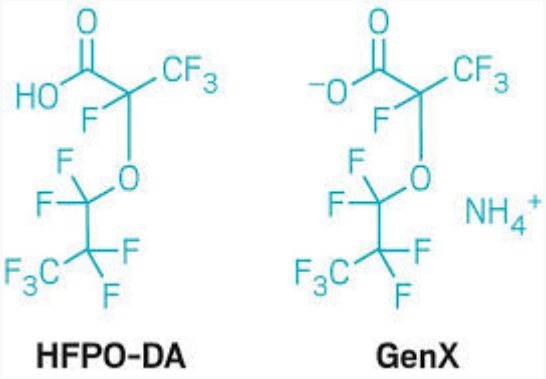
Aquatic Life Criteria

Technical Assistance to Regions, States, Tribes for 2018-2019



Human Health Criteria

Draft GenX Chemicals Toxicity Values



- In November 2018, EPA published a draft toxicity assessment for hexafluoropropylene oxide (HFPO) dimer acid HFPO dimer acid ammonium salt or GenX chemicals for public comment.
- The toxicity assessments present toxicity values (i.e., reference doses or RfDs) that when finalized can be combined with exposure information (e.g., for drinking water, ambient water, soil, air) to help characterize potential public health risks.
- The public comment period ended January 2019.
- Based on public comment, work is underway to re-evaluate scientific data used in the assessment.

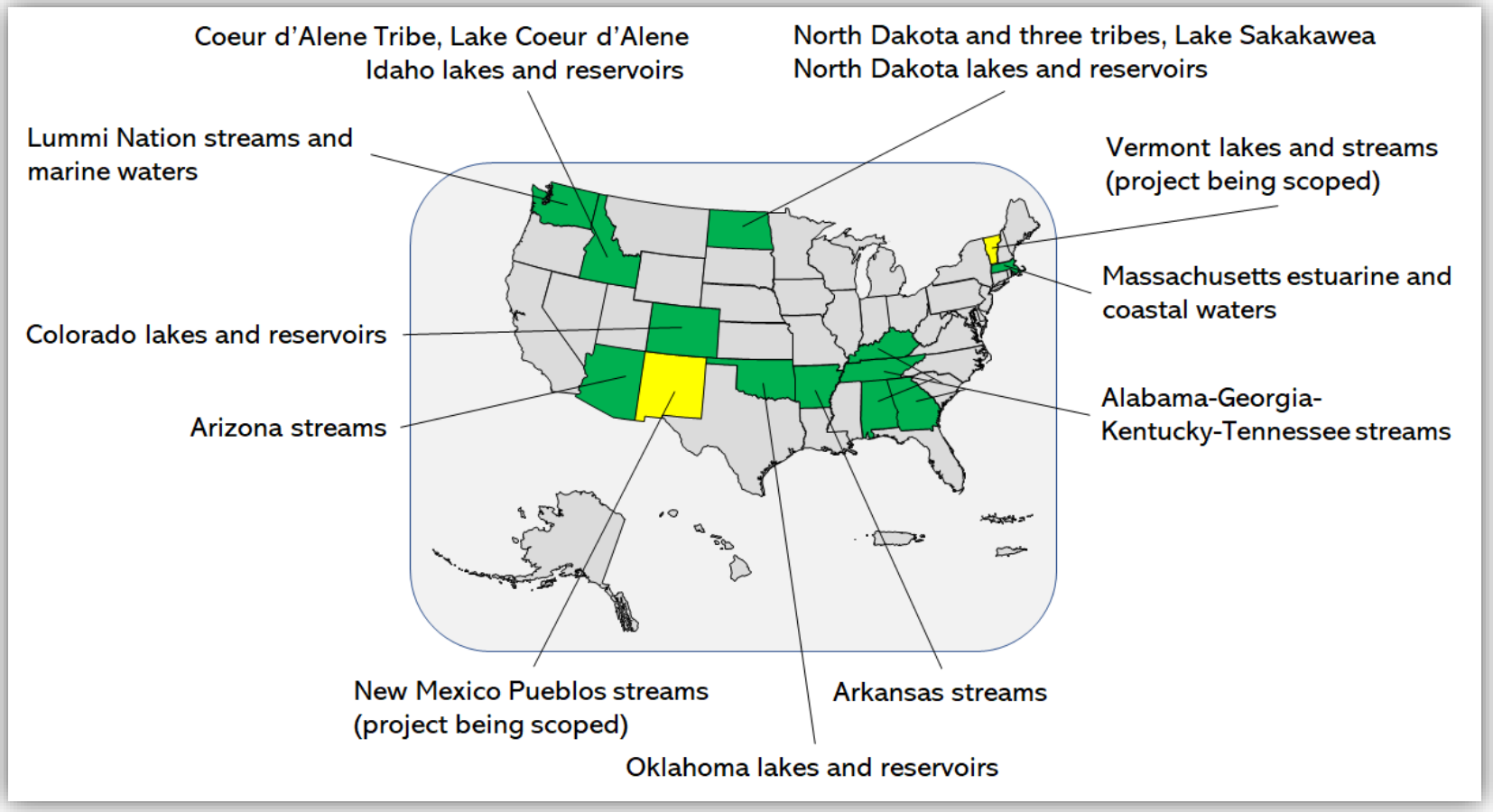
Human Health Criteria

Recreational Criteria/Swimming Advisories for Cyanotoxins

- May 2019: EPA published national recommended recreational ambient water quality criteria or swimming advisories for the cyanotoxins microcystins and cylindrospermopsin.
  - Recommended concentrations of microcystins and cylindrospermopsin in recreational waters which are protective of human health while swimming or participating in other activities in or on the water.
- States can consider adopting these criteria into their water quality standards and using them for Clean Water Act purposes. Alternatively, states can use these same values as the basis of swimming advisories for public notification purposes at beaches.

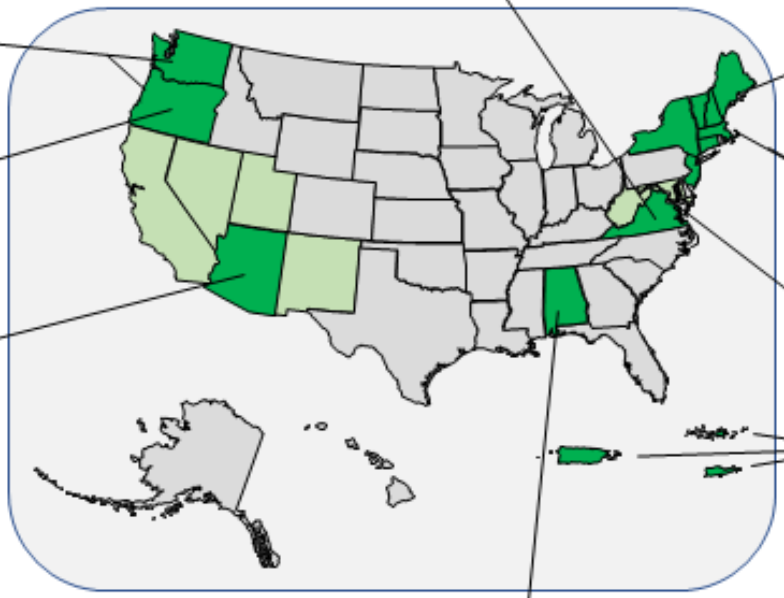
Numeric Nutrient Criteria

N-STEPS Technical Support



Biocriteria

Biocriteria Technical Assistance



Virginia benthic community tolerance values (TVs) for multiple stressors (dark green) coordinating with adjacent states for multistate TVs (light green)

BCG model for Pacific Northwest Maritime Region (benthic)

Statistical Analysis and Update of Oregon O/E models (biocriteria)

Biological Assessment Tools and Methods for Arizona streams with highly variable flow (dark green) coordinating with adjacent states and data (light green)

NorthEast Regional Voucher Flora Lake Sediment Diatoms

Narragansett and Massachusetts Bay BCG (habitat mosaic)

New Jersey stream BCGs (benthic, fish, diatoms)

Puerto Rico and USVI BCGs (benthic, fish)

Alabama: ecoregional biological criteria (benthic) and BCG models for streams (benthic, fish), critical elements review

Current: scoping technical assistance projects in Regions 5, 6, 7 and 8.

Biosolids (Treated Sewage Sludge)

OIG Biosolids Report

- The EPA's Office of Inspector General (OIG) report entitled, *"EPA Unable to Assess the Impact of Hundreds of Unregulated Pollutants in Land-Applied Biosolids on Human Health and the Environment"* (November 15, 2018).
- The report and EPA responses to the OIG recommendations (appendix D of the report) are publicly available.
- While EPA agrees that the Biosolids Program can be improved, many of the OIG recommendations were already being addressed by the EPA prior to the audit. OW increased resources for the biosolids program in FY19.
- One recommendation, revisions to the biosolids website, should be complete at the end of September, pending review.

Biosolids (Sewage Sludge)

Biennial Reviews

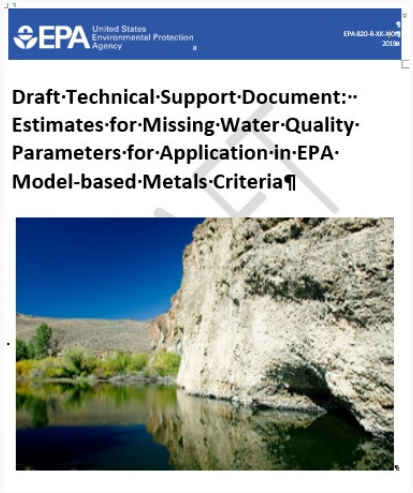
- EPA is required to review biosolids regulations every two years to identify pollutants that occur in biosolids
- Published the 2016-2017 Biennial in 2019
  - Reviewed 32 new journal articles
  - Identified 28 new chemicals in biosolids
  - Identified new data for 31 chemicals previously identified in biosolids.
  - Revised format
- Next Biennial Review will cover Jan 2018-Dec 2019 and will be published in 2020

PLANNED IN FY2020

Aquatic Life Criteria

Missing Parameters

- Publish an updated draft with data from publicly available USGS and EPA sources
- The document compiles measured water chemistry data for fresh waters across the US and provides a *range of centiles* at the Level 3 Ecoregion for:
  - Geochemical ions: calcium, magnesium, sulfate, potassium, chloride, sulfate,
  - Hardness, alkalinity, conductivity
  - Dissolved organic carbon
- The document is intended to provide useful data for states and tribes to fill in missing data needed to run equation-based criteria, when ambient data are not available.
- The document is targeted to be released for public comment in December 2019



Aquatic Life Criteria

PFOA and PFOS Draft Criteria

- Work has been initiated to develop national recommended CWA 304(a) aquatic life criteria for PFOA and PFOS, as well as other PFAS chemicals, as data allow.
- Our goal is to provide information to states and tribes so that they can protect their ambient waters (aquatic life and aquatic dependent wildlife) by controlling discharges of PFAS.
- OST has begun data quality review of ecotoxicity data on PFOA and PFOS
- Working with ORD, OST is compiling tissue and water data that can be used to calculate bioaccumulation factors for aquatic life and aquatic-dependent wildlife
- OW is working with ACWA to plan a problem formulation meeting this Fall with states and tribes, to discuss foreseeable science and implementation issues.
- Evaluation of data available to develop aquatic life criteria for PFOA/S and potentially other PFAS by 2022

Aquatic Life Criteria

Updated criteria for chloride/sulfate

- Current 1988 national criteria for chloride were derived based on toxicity test data of sodium chloride in laboratory-reconstituted water.
- New toxicity data have become available for additional taxa (particularly for mussels and mayflies) and on the important effects of ion interactions on toxicity.
- We are working with EPA Region 5 and ORD to develop a toxicity database and modeling approach to describe ion interactions.
  - Have conducted a literature search and are currently completing data quality review of the studies
- Updated criteria will account for the effects of water ionic composition in calculating chloride/sulfate criteria.
- Draft Criteria expected to be published for public comment in 2020.

Aquatic Life Criteria

Metals Cooperative Research and Development Agreement (CRADA)

- In January 2018 EPA entered into a Cooperative Research and Development Agreement, or CRADA, with eight metals associations to leverage scientific expertise and data on the aquatic toxicity of metals.
- Work is ongoing to develop a simplified modeling approach that can predict the bioavailability and toxicity of metals in the aquatic environment using the most current science.
- In Phase I of this project, collaborators are comparing the accuracy and usability of a variety of modeling approaches under various environmental conditionsfor a variety of metals.
- Case studies are under development comparing the multiple linear regression (MLRs) models and the biotic ligand models (BLMs).

Aquatic Life Criteria

Aquatic Life Criteria for Toxics Outreach Workshop

- HECD/ERAB scientists are planning meetings with regional and state partners to:
  - update partners on ERAB activities
  - solicit input on priorities for states and regions
  - learn about what states and regions are working on regarding aquatic life criteria
- Starting as early as December 2020
- Stay tuned!

Drinking Water Protection Activities

Regulatory Determination 4

- Providing support on the human health effects associated with the contaminants being considered under Reg Det 4,
- Preliminary determination expected to include PFOA and PFOS (December 2019)

Unregulated Contaminant Monitoring Rule (UCMR) 4 and 5

- Providing technical input on candidate contaminants for drinking water monitoring
- Monitoring list finalized December 2016; monitoring 2018-2020
- Final report 2021. UCMR5 (list to be finalized December 2021)

Contaminant Candidate List (CCL)

- Developing list of potential compounds of emerging concern in drinking water
- Draft January 2021; Final July 2022

PFAS toxicity values

- GenX final values (June 2020, contingent on NIEHS report)

Drinking Water Protection Activities

Pharmaceutical Benchmarks

- Pharmaceuticals have been identified at very low (ng/L) concentrations in source and treated drinking waters in the United States due to increasing usage and enhanced detection methods.
- EPA is working with a Federal Workgroup on Pharmaceuticals in Water develop Human Health Benchmarks for Pharmaceuticals based on information used by the Food and Drug Administration (FDA) in regulation.
- Benchmarks are non-regulatory and provide information to help states, tribes, and water systems to better characterize potential health risks associated with the occurrence of pharmaceuticals in drinking water and to prioritize monitoring.

Human Health

FSTRAC

- The Federal-State Toxicology and Risk Analysis Committee (FSTRAC) is made up of representatives from State public health and environmental agencies and EPA Headquarters and Regional personnel.
- EPA is working with the FSTRAC Steering committee to update the Charter and solicit new members.
- The mission of FSTRAC is to strengthen relationships and cooperation among EPA, states and tribes through the exchange of technical information primarily regarding water-related human health and risk assessment related to water quality criteria.
- FSTRAC holds quarterly webinars on a variety of topics.
- In the fall of 2020, FSTRAC will plan a face-to face meeting for members

Human Health Criteria

PFOA and PFOS Draft Criteria

- Work has been initiated to develop national recommended CWA 304(a) human health criteria for PFAS chemicals, as data allow.
- Our goal is to provide information to states and tribes so that they can protect their ambient waters (fish and source drinking water) by controlling discharges of PFAS.
- OST has begun working to compile data that can be used to calculate nationally representative bioaccumulation factors for edible fish tissue
- Evaluation of data available to develop Human Health criteria for PFOA/PFOS by 2021
- OW is working with ACWA to plan a problem formulation meeting this Fall with states and tribes, to discuss foreseeable science and implementation issues.

Recreational Criteria

Coliphage

- The EPA is developing Recreational Water Quality Criteria for coliphage, a viral indicator, to ensure public health protection from water sources that have been influenced by fecal contamination
- Since 2015 the EPA has held webinars, conferences, listening sessions, and a coliphage expert workshop with States and other stakeholders.
- In 2018 the EPA published an analytical method following a single-lab and multi-lab validation in 2017.
- EPA is aiming to develop draft coliphage criteria and initiate external peer-review in 2020.

Numeric Nutrient Criteria

Updated Numeric Nutrient Criteria for Lakes

- We are updating the 2000-2001 nutrient criteria for lakes and reservoirs using a new approach and new data.
- This new approach relies on the use of stressor-response analyses and uses data from EPA's National Lakes Assessment to develop criteria recommendations that are protective of aquatic life, recreation, and source drinking water designated uses.
- We have focused on state pilots for the past couple of years which have strengthened this approach.
- State monitoring data can be added to the models to generate state-specific criteria that build on the strength of the statistical relationships found in the national models OR states may use criteria derived with the national models.
- Our goal is to publish draft criteria for public comment in early 2020.

Numeric Nutrient Criteria

Revamped website for Nutrient Scientific Technical Exchange Partnership and Support (N-STEPS)

- "**N-STEPS Online**" is a web-based repository of previously published technical information for scientists and managers interested in numeric nutrient water quality criteria
- It was developed with states using a User Centered Design approach
- Will be hosted in the cloud which allows for greater flexibility in website design than is allowed in Drupal.

N-STEPS Technical Support

- We will soon be sending out an email to the regional nutrient coordinators to solicit requests from their states, tribes and territories for technical support in 2020.
- All requests to help derive numeric nutrient criteria or numeric translators of narrative criteria are welcomed.
- We are especially interested in receiving requests for pilots that will help expand the current scientific understanding of nutrient criteria development:
  - That uses high frequency continuous monitoring data,
  - That uses remote sensing data in rivers and estuaries, or
  - For unique systems, such as large rivers, turbid streams, etc.

Biocriteria Technical Support

- Last month, we sent an email to the regional biocriteria coordinators to solicit requests from their states, tribes and territories for technical support in 2020.
- Specifically, we can offer assistance with:
  - Development of Biological Condition Gradients that can help better describe incremental change in aquatic systems.
  - Critical Elements Reviews to help states evaluate the technical capability of their bioassessment program to target future investments.
- Like N-STEPS, all requests related to biocriteria development are welcome.
- We are especially interested in pilots that will help expand the current scientific understanding about:
  - Lakes
  - Large rivers
  - Estuaries
  - Near-coastal waters

Biosolids

Biosolids Webinars

- The Biosolids Team is coordinating a series of webinars to re-engage stakeholders working in biosolids
- The first is being scheduled now and will provide an overview of OST's current activities surrounding biosolids and 40 CFR Part 503
  - September 25, 2019, 2:00-3:00 pm EDT
- Additional topics will include methods and sampling procedures for biosolids and PFASs in biosolids

Biosolids

EPA Biosolids Meeting (formerly “states” meeting)

In the Spring of 2020, the EPA will hold the first Biosolids Meeting since 2011.

- The meeting provides an opportunity for states, tribes and biosolids stakeholders to exchange information and ideas on challenges and opportunities related to biosolids management.
- The EPA will fund one representative from each state (50 total) and three tribes.
- The meeting will include laboratory methods demonstrations.
- In addition, states will be asked to participate in discussions that will support an assessment of PFOA and PFOS in biosolids.

Biosolids

Problem Formulation for PFOA and PFOS in biosolids

- The EPA plans to conduct risk assessments for PFOA and PFOS in biosolids and will begin that process with problem formulation.
- Assessments will address human health and ecological risks (aquatic and terrestrial) resulting from land application of biosolids
- EPA will hold a problem formulation meeting with states and tribes in the Spring of 2020, to discuss foreseeable science and implementation issues.
- OW continues to closely collaborate within EPA offices, across the federal government, and welcomes input from states and local municipalities.
- Our goal is to gain a better understanding of PFAS occurrence in biosolids and the potential for associated human health and ecological risks.

Biosolids

Biosolids Risk Screening Tool

- Biennial reviews, published since 2005, have identified 352 compounds in biosolids.
- EPA is developing a screening tool to prioritize chemicals and focus risk assessment on those chemicals that are have the potential to pose risks to human or environmental health
- Tool validation is ongoing. We are aiming to release the tool for public comment in Spring 2020.
- EPA is also evaluating a more advanced modeling tool to be used for compounds that do not pass the screen

Biosolids

Resource Recovery

- 40 CFR Part 503 established standards for the final use or disposal of sewage sludge generated during the treatment of domestic sewage in a treatment works
- These standards consist of general requirements, pollutant limits, management practices, and operational standards,
- Published in 1993, the standards do not explicitly address resource recovery technologies and resulting products.
- EPA is aware of a number of innovative products generated as part of the treatment process and is working to establish a consistent process for evaluating those that are intended for land application.

Thanks for your interest

Betsy Behl

Colleen Flaherty

Kathryn Gallagher (aquatic life)

Dana Thomas (nutrients, biocriteria)

Jamie Strong (human health)

Elizabeth Resek (biosolids)